

SEQUENCE LISTING

<110> Allen, Stephen M.
Caimi, Perry G.
Stoop, Johan M.

<120> Fructan Biosynthetic Enzymes

<130> BB1463 US NA

<140>

<141>

<150> 60/244,273

<151> 2000-10-10

<150> 60/269,543

<151> 2001-02-16

<160> 21

<170> Microsoft Office 97

<210> 1

<211> 2080

<212> DNA

<213> Dimorphotheca sinuata

<400> 1

gcacgagctt	aatcagccca	ttttcctcca	ccatgacaac	caccaaacc	tttagtgacc	60
ttgaggacgc	acccctactg	aaccacaccg	aaccaccacc	accaccgcca	ccgccaaactg	120
ccggaagaaa	acggttggtg	atcaaggttg	tgtcagttat	caccctactc	attttgctta	180
ttgtttcagt	ttgtttctc	aaccaacaaa	attcaagtca	ctccaccacc	aattcaaaat	240
cgatctccca	atccgatcgc	ctcatttggg	aaagaacatc	tttccatttt	caaccgcgcca	300
aaaatttcat	ttacgatccc	aatggggccat	tatttcacat	gggttggtac	catcttttct	360
atcaatacaa	cccgtacggg	cctggttggtg	gaaatatgtc	atgggggtcac	tccggtttcca	420
aagacatgat	caactggttt	gagcttccag	tgcgattggt	cccaaccgaa	tggtacgata	480
tcgaggggtg	tttatccggg	tccaccaccg	tcttcccaa	cgggtcaaate	ttcgatttgt	540
acacaggaaa	cgctaacgat	ttctcccaat	tacaatgcaa	agctgtaccc	gtcaacatat	600
ctgaccact	tcttatcgag	tggttcaaat	acgatggtaa	cccaatcctg	tatactccac	660
cagggattgg	gttaaaagac	tatcgggacc	cgtcaacagt	ctggacgggt	cccgatggaa	720
aacatcggat	gatcatggga	tctaaacgaa	acaaaacggg	actagtactt	gtttaccaca	780
caaccgattt	cacaaattat	gtgatgtcgg	atgagccgtt	gcattcggta	cctaataccg	840
atatgtggga	atgcgttgac	ttttaccctg	tttcggtgac	caatgatagc	gcgcttgata	900
tggcggtcta	tgggtcgggt	atcaaacacg	tgattaaaga	aagttgggag	ggacatggaa	960
tggattggta	ttcgattggg	acttatgatg	catcaaccga	taaatggact	ccggataacc	1020
cgaaattaga	tgtgggtatc	gggttgcgat	gtgattacgg	aaagtgtttt	gcatacgaaga	1080
gtcttttcga	tccgttgaag	aaaaggaggg	tgacttgggg	ttatgttggtg	gaatcagata	1140
aacctgatca	ggacctctct	agaggatggg	ctaccattta	taatgttgca	cggacgggtg	1200
tactagatag	aaagaccgga	acacatctac	ttcattggcc	agttgaagaa	atcgagagtt	1260
tgagatccaa	tggtcaagaa	ttcaacgaga	ttgaactcaa	accgggttcg	atcattccac	1320
ttgacatagg	ctcggctact	cagtttgaca	tagttgcgac	atttgaagtg	gatcaagatg	1380
cgttgaaaagc	tataagtga	accaacgaag	aatatatttg	taccaaagc	tggttggtgcag	1440
ccggaagggtg	aagtttggtg	ccatttggtg	ttgcggtttt	agccgatgga	acactttcag	1500
agtttaactcc	cgtgtatttc	tacatagcta	aaaatacga	tggaaagtga	gcaacacatt	1560
tttgtaaccga	taagctaaga	tcatcactag	attatgatcg	tgaagagagt	gtgtatggaa	1620
gcactgtccc	tgtgcttgat	ggtgaagaac	tcacaatgag	gttattgggtg	gaccattcgg	1680
tagtagaagg	gtttgcgcaa	ggaggaagga	cggtaataac	atcaagggtc	tatccgacaa	1740
aggcaatata	cgacaacgcg	aaggtgttct	tattcaacaa	cgctactggt	acgagtgtga	1800
aggcgtctct	caagatttg	caaattggctc	ctgccagat	taaaccttac	cctctttaat	1860

catatgtttc atttcactct cactagaaca cttgctgtta ctattattgt atcttatatt 1920
 ttttatatgt acgtaataat taccgttttg atggttttgt tttgttcaac ctctgcattg 1980
 tgtgttaagt agtaagccgc gattatttta ataatatgaa taggttggtt tgttcaaaaa 2040
 aaaaaaaaaa aaaaaaaaaa aaaaaaaaaa aaaaaaaaaa 2080

<210> 2
 <211> 608
 <212> PRT
 <213> Dimorphotheca sinuata

<400> 2
 Met Thr Thr Thr Lys Pro Phe Ser Asp Leu Glu Asp Ala Pro Leu Leu
 1 5 10 15
 Asn His Thr Glu Pro Pro Pro Pro Pro Pro Pro Thr Ala Gly Arg
 20 25 30
 Lys Arg Leu Leu Ile Lys Val Val Ser Val Ile Thr Leu Leu Ile Leu
 35 40 45
 Leu Ile Val Ser Val Leu Phe Leu Asn Gln Gln Asn Ser Ser His Ser
 50 55 60
 Thr Thr Asn Ser Lys Ser Ile Ser Gln Ser Asp Arg Leu Ile Trp Glu
 65 70 75 80
 Arg Thr Ser Phe His Phe Gln Pro Ala Lys Asn Phe Ile Tyr Asp Pro
 85 90 95
 Asn Gly Pro Leu Phe His Met Gly Trp Tyr His Leu Phe Tyr Gln Tyr
 100 105 110
 Asn Pro Tyr Gly Pro Val Trp Gly Asn Met Ser Trp Gly His Ser Val
 115 120 125
 Ser Lys Asp Met Ile Asn Trp Phe Glu Leu Pro Val Ala Leu Val Pro
 130 135 140
 Thr Glu Trp Tyr Asp Ile Glu Gly Val Leu Ser Gly Ser Thr Thr Val
 145 150 155 160
 Leu Pro Asn Gly Gln Ile Phe Ala Leu Tyr Thr Gly Asn Ala Asn Asp
 165 170 175
 Phe Ser Gln Leu Gln Cys Lys Ala Val Pro Val Asn Ile Ser Asp Pro
 180 185 190
 Leu Leu Ile Glu Trp Val Lys Tyr Asp Gly Asn Pro Ile Leu Tyr Thr
 195 200 205
 Pro Pro Gly Ile Gly Leu Lys Asp Tyr Arg Asp Pro Ser Thr Val Trp
 210 215 220
 Thr Gly Pro Asp Gly Lys His Arg Met Ile Met Gly Ser Lys Arg Asn
 225 230 235 240
 Lys Thr Gly Leu Val Leu Val Tyr His Thr Thr Asp Phe Thr Asn Tyr
 245 250 255

Val	Met	Ser	Asp	Glu	Pro	Leu	His	Ser	Val	Pro	Asn	Thr	Asp	Met	Trp	260	265	270
Glu	Cys	Val	Asp	Phe	Tyr	Pro	Val	Ser	Leu	Thr	Asn	Asp	Ser	Ala	Leu	275	280	285
Asp	Met	Ala	Ala	Tyr	Gly	Ser	Gly	Ile	Lys	His	Val	Ile	Lys	Glu	Ser	290	295	300
Trp	Glu	Gly	His	Gly	Met	Asp	Trp	Tyr	Ser	Ile	Gly	Thr	Tyr	Asp	Ala	305	310	315
Ser	Thr	Asp	Lys	Trp	Thr	Pro	Asp	Asn	Pro	Lys	Leu	Asp	Val	Gly	Ile	325	330	335
Gly	Leu	Arg	Cys	Asp	Tyr	Gly	Lys	Phe	Phe	Ala	Ser	Lys	Ser	Leu	Phe	340	345	350
Asp	Pro	Leu	Lys	Lys	Arg	Arg	Val	Thr	Trp	Gly	Tyr	Val	Gly	Glu	Ser	355	360	365
Asp	Lys	Pro	Asp	Gln	Asp	Leu	Ser	Arg	Gly	Trp	Ala	Thr	Ile	Tyr	Asn	370	375	380
Val	Ala	Arg	Thr	Val	Val	Leu	Asp	Arg	Lys	Thr	Gly	Thr	His	Leu	Leu	385	390	395
His	Trp	Pro	Val	Glu	Glu	Ile	Glu	Ser	Leu	Arg	Ser	Asn	Gly	Gln	Glu	405	410	415
Phe	Asn	Glu	Ile	Glu	Leu	Lys	Pro	Gly	Ser	Ile	Ile	Pro	Leu	Asp	Ile	420	425	430
Gly	Ser	Ala	Thr	Gln	Leu	Asp	Ile	Val	Ala	Thr	Phe	Glu	Val	Asp	Gln	435	440	445
Asp	Ala	Leu	Lys	Ala	Ile	Ser	Glu	Thr	Asn	Glu	Glu	Tyr	Ile	Cys	Thr	450	455	460
Lys	Ser	Trp	Gly	Ala	Ala	Gly	Arg	Gly	Ser	Leu	Gly	Pro	Phe	Gly	Val	465	470	475
Ala	Val	Leu	Ala	Asp	Gly	Thr	Leu	Ser	Glu	Leu	Thr	Pro	Val	Tyr	Phe	485	490	495
Tyr	Ile	Ala	Lys	Asn	Thr	Asp	Gly	Ser	Val	Ala	Thr	His	Phe	Cys	Thr	500	505	510
Asp	Lys	Leu	Arg	Ser	Ser	Leu	Asp	Tyr	Asp	Arg	Glu	Arg	Val	Val	Tyr	515	520	525
Gly	Ser	Thr	Val	Pro	Val	Leu	Asp	Gly	Glu	Glu	Leu	Thr	Met	Arg	Leu	530	535	540
Leu	Val	Asp	His	Ser	Val	Val	Glu	Gly	Phe	Ala	Gln	Gly	Gly	Arg	Thr	545	550	555
Val	Ile	Thr	Ser	Arg	Val	Tyr	Pro	Thr	Lys	Ala	Ile	Tyr	Asp	Asn	Ala	565	570	575

Lys Val Phe Leu Phe Asn Asn Ala Thr Gly Thr Ser Val Lys Ala Ser
580 585 590

Leu Lys Ile Trp Gln Met Ala Pro Ala Gln Ile Lys Pro Tyr Pro Leu
595 600 605

<210> 3
<211> 2146
<212> DNA
<213> Parthenium argentatum Grey

<400> 3
gcacgaggag accagtcagc acacagtaac tgaactcact caacccatta ttcacottca 60
ccatgacaac ccctgaacaa cccattacag accttgaaca cgaacccaac cacaaccgca 120
caccocctatt ggaccacaac gaatcacaac ccgtaaagaa acatttggtc ttcaaagttc 180
tgtctgggtgt taccttcatt tcattggtct ttatttctgc ttttttattc attgttttga 240
accaacaaaa ttctaccaat atatcggtta agtactcgca atccgatcgc cttacgtggg 300
aacgaaccgc ttttcatttt caaccggcca agaattttat ttatgatccc aatgggtcaa 360
tgtactacat gggctggtag catctattct atcaatacaa tccatacgca ccggtttggg 420
gtaatatgtc atggggtcac tccgtatcca aagacatgat caactggtag gagctaccg 480
tcgctatagt cccgatgaa tgggtatgata ttgagggcgt cttatctggg tccatcacag 540
tgcttcccaa cgggcagatc tttgcattgt acacggggaa tgctaatac ttttcccaat 600
tgcaatgcaa agctgtaccc gtgaactcat ctgaccact tcttggttag tgggtcaagt 660
acgaagataa cccaatcctg tacactccac cagggtattg gttaaaagac tatagggacc 720
cgtcaacagt ctggacgggt cctgatggaa agcataggat gatcatggga actaaacgtg 780
gcaatacagg aatgatactt gtttaccata ccactgatta cacgaactat gagatgttga 840
atgagcctat gcaactcggtt cccaataccg atatgtggga atgctgtgac ttttaccggg 900
tttcattaac caacgatagt gcacttgata ttgcggccta cgggtcgggt atcaaacacg 960
tgattaaaga aagttgggag gcatatggga tggatttcta ttcaatcggg acttatgacg 1020
catttaacga taaatggact cccgataacc cagagttaga tgttggtatc ggggtgcggt 1080
gtgattacgg taggtttttt gcatcaaaga gtatttttga cccagtgaag aaaaggagga 1140
tcacttgggc ttatgttgga gaatcagata atgctgatga tgacctctcc agaggatggg 1200
ctactattta taatgttgga agaactattg tactagatag aaagaccggg acccatttac 1260
ttcattggcc tgtcaggaa atcgagagtt tgagatacaa tggtcaggaa tttaaagaga 1320
tcaaactaga gcccggttca attgctccac tcgacatagg caccgctaca cagttggaca 1380
tagttgcaac atttaaggtg gatgaggctg cattgaacgc gacaagtga accgatgata 1440
acttcgcttg caccacgagc tcaggtgcag ttgaaagggg aagtttggga ccatttggtc 1500
ttgcggttct agctgatgga accctttccg agttaactcc ggtttatttc tacattgcta 1560
aaaaggccga tggaggtgtg tcaacacatt tttgtaccga taagctaagg tcatccttgg 1620
attttgataa ggagagagtg gtgtacggta gcactgttcc tgtgttagat gatgaagaac 1680
tcacaatgag gctattgggt gatcattcgg tagtcgaggc gtttgcacaa ggaggaagga 1740
ttgccataac atcaagggtg tatccgacga aagcaatata cgaaggagcg aagttgttct 1800
tattcaacaa tgccacggat acgagtgtga aggcattctc caagatttgg caaatggctt 1860
ctgccccaat tcatcaatac gagtttaatt aggggctctc gttatcctta ttattagtat 1920
ttatgtattt taatttattt agacctatgt atttgatcat atgagttctt atcgtgcttt 1980
aagtagtaaa tgaattgtgt ttgggtaaaa aaataaaaaa aaaaaaaaaa aaaaaaaaaa 2040
aaaaaaaaaa aaaaaaaaaa aaaaaaaaaa aaaaaaaaaa aaaaaaaaaa aaaaaaaaaa 2100
gaaaaaaaaa aaaaaaaaaa aaaaaaaaaa aaaaaaaaaa aaaaaa 2146

<210> 4
<211> 609
<212> PRT
<213> Parthenium argentatum Grey

<400> 4
Met Thr Thr Pro Glu Gln Pro Ile Thr Asp Leu Glu His Glu Pro Asn
1 5 10 15

FOOEOE = 26EEOOE

Gly	Leu	Arg	Cys	Asp	Tyr	Gly	Arg	Phe	Phe	Ala	Ser	Lys	Ser	Ile	Phe	340	345	350	
Asp	Pro	Val	Lys	Lys	Arg	Arg	Ile	Thr	Trp	Ala	Tyr	Val	Gly	Glu	Ser	355	360	365	
Asp	Asn	Ala	Asp	Asp	Asp	Leu	Ser	Arg	Gly	Trp	Ala	Thr	Ile	Tyr	Asn	370	375	380	
Val	Gly	Arg	Thr	Ile	Val	Leu	Asp	Arg	Lys	Thr	Gly	Thr	His	Leu	Leu	385	390	395	400
His	Trp	Pro	Val	Glu	Glu	Ile	Glu	Ser	Leu	Arg	Tyr	Asn	Gly	Gln	Glu	405	410	415	
Phe	Lys	Glu	Ile	Lys	Leu	Glu	Pro	Gly	Ser	Ile	Ala	Pro	Leu	Asp	Ile	420	425	430	
Gly	Thr	Ala	Thr	Gln	Leu	Asp	Ile	Val	Ala	Thr	Phe	Lys	Val	Asp	Glu	435	440	445	
Ala	Ala	Leu	Asn	Ala	Thr	Ser	Glu	Thr	Asp	Asp	Asn	Phe	Ala	Cys	Thr	450	455	460	
Thr	Ser	Ser	Gly	Ala	Val	Glu	Arg	Gly	Ser	Leu	Gly	Pro	Phe	Gly	Leu	465	470	475	480
Ala	Val	Leu	Ala	Asp	Gly	Thr	Leu	Ser	Glu	Leu	Thr	Pro	Val	Tyr	Phe	485	490	495	
Tyr	Ile	Ala	Lys	Lys	Ala	Asp	Gly	Gly	Val	Ser	Thr	His	Phe	Cys	Thr	500	505	510	
Asp	Lys	Leu	Arg	Ser	Ser	Leu	Asp	Phe	Asp	Lys	Glu	Arg	Val	Val	Tyr	515	520	525	
Gly	Ser	Thr	Val	Pro	Val	Leu	Asp	Asp	Glu	Glu	Leu	Thr	Met	Arg	Leu	530	535	540	
Leu	Val	Asp	His	Ser	Val	Val	Glu	Ala	Phe	Ala	Gln	Gly	Gly	Arg	Ile	545	550	555	560
Ala	Ile	Thr	Ser	Arg	Val	Tyr	Pro	Thr	Lys	Ala	Ile	Tyr	Glu	Gly	Ala	565	570	575	
Lys	Leu	Phe	Leu	Phe	Asn	Asn	Ala	Thr	Asp	Thr	Ser	Val	Lys	Ala	Ser	580	585	590	
Leu	Lys	Ile	Trp	Gln	Met	Ala	Ser	Ala	Gln	Ile	His	Gln	Tyr	Glu	Phe	595	600	605	

Asn

<210> 5
 <211> 1333
 <212> DNA
 <213> Helianthus sp.

```

<400> 5
gcacgaggtc aacagtcttg acaggtcccg atggaaagca taggatgac atgggatcta 60
aacgtggcaa tacaggcatg atactcgttt accataccac cgattacacg aactacgagt 120
tggttgatga gccgttgac tccgttccca acaccgatat gtgggaatgc gtcgactttt 180
acccggtttc gttaaccaat gatagtgcac ttgatatggc ggcctatggg tcgggtatca 240
aacacgttat taaagaaagt tgggaggagc atggaatgga ttggtattca atcgggacat 300
atgacgcgat aaatgataaa tggactcccg ataaccgga actagatgtc ggtatcgggt 360
tacggtgcga ttacgggaag ttttttgcat caaagagtct ttatgacca ttgaagaaaa 420
ggaggggtcac ttgggcttat gttggagaat cagatagtgt tgaccaggac ctctctagag 480
gatgggctac tgtttataat gttggaagaa caattgtact agatagaaaa accgggaccc 540
attactttca ttggcccgtt gaggaggtcg agagtttgag atacaacggt caggagtta 600
aagagatcga gctagagccc gtttcaatca ttccactcga cataggcacg gctacacagt 660
tggacatagt tgcaacattt gaggtggatc aagcagcgtt gaacgcgaca agtgaaccg 720
atgatattta tggttgcacc actagcttag gtgcagccca aaggggaagt ttgggacat 780
ttggtcttgc ggttctagcc gatggaaccc tttctgagtt aactccggtt tatttctaca 840
ttgctaaaaa ggccgatgga ggtttgtcga cacatthttg taccgataag ctaagggtcat 900
cactggatta tgatggacag agagtgggtg atgggagcac tgttcctgtg ttagatgatg 960
aagaactcac aatgaggcta ttggtggatc attcgatagt agagggggtt gcgcaaggag 1020
gaaggacggt tataacatca aggtgtatc caacaaaagc gatatacgaa caagcgaagt 1080
tggtcttggt caacaacgct acaggtacga gtgtgaaggc atctctcaag atttggcaaa 1140
tggcttctgc acaaattcat caatactcgt ttttaattacc ggctattgct atctttttgt 1200
tattggtatt tatgtatctt aattttcttt taaacctttt tatttgataa atattggttc 1260
ttgttattgt gattctagta gtaaatgaat ggtgttttgg gttatctgtt aaaaaaaaaa 1320
aaaaaaaaaa aaa 1333

```

```

<210> 6
<211> 390
<212> PRT
<213> Helianthus sp.

```

```

<400> 6
Thr Arg Ser Thr Val Trp Thr Gly Pro Asp Gly Lys His Arg Met Ile
  1             5             10             15

Met Gly Ser Lys Arg Gly Asn Thr Gly Met Ile Leu Val Tyr His Thr
          20             25             30

Thr Asp Tyr Thr Asn Tyr Glu Leu Leu Asp Glu Pro Leu His Ser Val
  35             40             45

Pro Asn Thr Asp Met Trp Glu Cys Val Asp Phe Tyr Pro Val Ser Leu
  50             55             60

Thr Asn Asp Ser Ala Leu Asp Met Ala Ala Tyr Gly Ser Gly Ile Lys
  65             70             75             80

His Val Ile Lys Glu Ser Trp Glu Gly His Gly Met Asp Trp Tyr Ser
          85             90             95

Ile Gly Thr Tyr Asp Ala Ile Asn Asp Lys Trp Thr Pro Asp Asn Pro
      100             105             110

Glu Leu Asp Val Gly Ile Gly Leu Arg Cys Asp Tyr Gly Lys Phe Phe
      115             120             125

Ala Ser Lys Ser Leu Tyr Asp Pro Leu Lys Lys Arg Arg Val Thr Trp
      130             135             140

Ala Tyr Val Gly Glu Ser Asp Ser Val Asp Gln Asp Leu Ser Arg Gly
      145             150             155             160

```

[illegible]

<211> 1844

<212> DNA

<213> Triticum aestivum

<400> 7

52


```

tcgactttcta ccctgtcggt cgccgtagca gcgacaactc atcggagatg ttgcacgtgt 540
tgaaggcgag catggacgat gaacgacacg actactactc gctaggcacg tacgactcgg 600
cagcaaacac gtggacgccg attgaccggg acctcgactt ggggatcggg ctgaggtacg 660
attggggtaa gttttatgcg tccacctcgt tctatgatcc ggcgaagaag cggcgcggtgc 720
tgatggggta cgtcggcgag gtcgactcca agcgggctga tgtcgtgaag ggatgggcct 780
caattcagtc agttccaagg acaattgctc tcgacgagaa gacccggacg aacctcctcc 840
tctggcccgt ggaggagatt gagaccctcc gcctcaatgc cactgaactt agcgacgtca 900
ccatgaacac cggctccgtc atccatatcc ccctccgccca aggcactcag cttgacatcg 960
aggcaacttt ccaccttgat gcttctgcgg tcgctgccct caatgaggcc gatgtgggct 1020
acaactgcag cagcagcggc ggtgctgtta accgcggcgc gctaggcccc ttcggcctcc 1080
tcgtcctcgc tgcgtggtgac cgccgcggcg agcaaacggc ggtgtacttc tacgtgtcta 1140
ggggccttga tggaggcctc cataccagct tctgccaaaga tgagttagcg tcgtcacggg 1200
ccaaggacgt gacaaagcgg gtgattggga gcacggtgcc ggtgctcgac ggcgaggctt 1260
tctcaatgag ggtgctcgtg gaccactcca tcgtgcaggg cttcgcgatg ggcgggagga 1320
ccacgatgac gtcgcgggtg taccgatgg aggcctatca ggaggcaaaa gtgtacttgt 1380
tcaacaatgc caccggtgcc agcgttatgg cggaaaggct cgtcgtgcac gagatggact 1440
cggcacacaa ccagctctcc aatatggacg attactcgta tgttcaatga agctcttgca 1500
tctcatcagt aataagctac attggatcaa agacgctcac caaggaaggc caagacatat 1560
gtaaacgatt ccgcacagcc tcgcttgacg aattgaaaca tctatccttg ggtcatgttc 1620
tgcattgatg tcacagtga ctatattact ttggtgggtg taggatcgat atagtttggg 1680
tgggtggaac tttgtttgtt tacatagtga accggtgtgg tctgcgtaat aagcttacgt 1740
gtttgttttag aaaatgaact attgttgttc gggagaaaaa aaaaaaaaaa aaaaaaaaaa 1800
aaaaaaaaaa aaaaaaaaaa aaaaaaaaaa aaaaaaaaaa aaaa 1844

```

```

<210> 8
<211> 495
<212> PRT
<213> Triticum aestivum

```

```

<400> 8
Thr Arg Trp Gly His Ala Val Ser Arg Asn Leu Val Thr Trp Arg Thr
  1                      5                      10                      15

Leu Pro Ile Ala Met Val Ala Asp Gln Trp Tyr Asp Ile Leu Gly Val
                20                25                30

Leu Ser Gly Ser Met Thr Val Leu Pro Asn Gly Thr Val Ile Met Ile
  35                40                45

Tyr Thr Gly Ala Thr Asn Ala Ser Ala Ile Glu Val Gln Cys Ile Ala
  50                55                60

Thr Pro Ala Asp Pro Asn Asp Pro Phe Leu Arg Arg Trp Thr Lys His
  65                70                75                80

Pro Ala Asn Pro Val Ile Trp Ser Pro Pro Gly Ile Gly Thr Lys Asp
                85                90                95

Phe Arg Asp Pro Met Thr Ala Trp Tyr Asp Glu Ser Asp Asp Thr Trp
  100                105                110

Arg Thr Leu Leu Gly Ser Lys Asp Asp Gln Asp Gly His His Asp Gly
  115                120                125

Ile Ala Met Met Tyr Lys Thr Lys Asp Phe Leu Asn Tyr Glu Leu Ile
  130                135                140

Pro Gly Ile Leu His Arg Val Glu Arg Thr Gly Glu Trp Glu Cys Ile
  145                150                155                160

```


Ala His Asn Gln Leu Ser Asn Met Asp Asp Tyr Ser Tyr Val Gln
 485 490 495

<210> 9
 <211> 1612
 <212> DNA
 <213> Triticum aestivum

<400> 9
 gcacgagacg acatcctggg ggtcctttcg ggctctatga cggtgctacc aaatggcacg 60
 gtcatcatga tctacacggg ggccaccaac gcctctgccg ttgaggtgca gtgcatcgcc 120
 acccccgccg accccaacga ccccttcctc cgccgctgga ccaagcaccg cgccaacccc 180
 gtcatctggt cgccgcccgg gatcggcacc aaggattttc gagaccgat gactgcttgg 240
 tacgatgaat ctgatgacac atggcgcacc ctcttgggt ccaaggatga ccacgacggt 300
 caccacgatg ggatcgccat gatgtacaag accaaggact tccttaacta cgagctcatc 360
 ccgggtatct tgcacgagt ccagcgcacc ggcgagtggg agtgattga cttctaccct 420
 gtcggccaca gaagcaacga caactcatcg gagatgttgc acgtgttgaa ggcgagcatg 480
 gacgacgaac ggcacgacta ctactcgcta ggcacgtacg actcggcagc aaacgcgtgg 540
 acgcccgatc acccgagct cgacttgggg atcgggctga gatacgactg gggtaagttt 600
 tatcggtcca cctcgttcta tgatccggca aagaagcggc gcgtgctgat ggggtacgtc 660
 ggcgaggtcg actccaagcg ggctgatgtc gtgaagggat gggcctcgat tcagtcagtt 720
 ccaaggacaa ttgctctcga cgagaagacc cggacgaacc tcctcctctg gcccgaggag 780
 gagattgaga cctccgcct caacgccacc gaacttagcg acgtcaccct taacaccggc 840
 tccgtcatcc atatcccgt ccgccaaggc actcagctcg acatcgaggc aactttccac 900
 cttgatgctt ctgccgtcgc tgccctcaat gagggccgatg tgggctacaa ctgcagcagc 960
 agcggcggtg ctgttaaccg cggcgcgcta ggcccttcg gcctcctcgt cctcgtctgt 1020
 ggtgaccgcc gtggcgagca aacggcggtg tatttctacg tgtctagggg gctcgacgga 1080
 ggcctccata ccagcttctg ccaagacgag ttgcggtcgt cacgggcca ggtatgagcg 1140
 aagcgggtga ttgggagcac ggtgccgggtg ctcgacggcg aggccttctc gatgaggggtg 1200
 ctcggtggacc actccatcgt gcagggttc gcgatgggcy ggaggaccac gatgacgtcg 1260
 cgggtgtacc cgatggaggc ctatcaggag gcaaaagtgt acttgttcaa caatgcgacc 1320
 ggtgccagcg tcatggcgga aaggctcgtc gtgcacgaga tggactcagc acacaaccag 1380
 ctctccaata tggacgatca ctcgatgtt caatgaagct cttgcatctc atcagtaata 1440
 agctacattg gatcaaagac gcgcaccaag gaaggccaag acatatgtaa atgattccgc 1500
 acagcctcgc ttgcagaatt gaaacatcta tccttgggtc atgttctgca ttgatgtcac 1560
 tgtgaactac agtatattac tttgttgggc gtagaaaaaa aaaaaaaaaa aa 1612

<210> 10
 <211> 471
 <212> PRT
 <213> Triticum aestivum

<400> 10
 Ala Arg Asp Asp Ile Leu Gly Val Leu Ser Gly Ser Met Thr Val Leu
 1 5 10 15
 Pro Asn Gly Thr Val Ile Met Ile Tyr Thr Gly Ala Thr Asn Ala Ser
 20 25 30
 Ala Val Glu Val Gln Cys Ile Ala Thr Pro Ala Asp Pro Asn Asp Pro
 35 40 45
 Phe Leu Arg Arg Trp Thr Lys His Pro Ala Asn Pro Val Ile Trp Ser
 50 55 60
 Pro Pro Gly Ile Gly Thr Lys Asp Phe Arg Asp Pro Met Thr Ala Trp
 65 70 75 80
 Tyr Asp Glu Ser Asp Asp Thr Trp Arg Thr Leu Leu Gly Ser Lys Asp
 85 90 95

Asp	His	Asp	Gly	His	His	Asp	Gly	Ile	Ala	Met	Met	Tyr	Lys	Thr	Lys	
			100					105					110			
Asp	Phe	Leu	Asn	Tyr	Glu	Leu	Ile	Pro	Gly	Ile	Leu	His	Arg	Val	Gln	
		115					120					125				
Arg	Thr	Gly	Glu	Trp	Glu	Cys	Ile	Asp	Phe	Tyr	Pro	Val	Gly	His	Arg	
	130					135					140					
Ser	Asn	Asp	Asn	Ser	Ser	Glu	Met	Leu	His	Val	Leu	Lys	Ala	Ser	Met	
145					150					155					160	
Asp	Asp	Glu	Arg	His	Asp	Tyr	Tyr	Ser	Leu	Gly	Thr	Tyr	Asp	Ser	Ala	
				165					170						175	
Ala	Asn	Ala	Trp	Thr	Pro	Ile	Asp	Pro	Glu	Leu	Asp	Leu	Gly	Ile	Gly	
			180					185					190			
Leu	Arg	Tyr	Asp	Trp	Gly	Lys	Phe	Tyr	Ala	Ser	Thr	Ser	Phe	Tyr	Asp	
		195					200					205				
Pro	Ala	Lys	Lys	Arg	Arg	Val	Leu	Met	Gly	Tyr	Val	Gly	Glu	Val	Asp	
	210					215					220					
Ser	Lys	Arg	Ala	Asp	Val	Val	Lys	Gly	Trp	Ala	Ser	Ile	Gln	Ser	Val	
225					230					235					240	
Pro	Arg	Thr	Ile	Ala	Leu	Asp	Glu	Lys	Thr	Arg	Thr	Asn	Leu	Leu	Leu	
				245					250					255		
Trp	Pro	Val	Glu	Glu	Ile	Glu	Thr	Leu	Arg	Leu	Asn	Ala	Thr	Glu	Leu	
			260					265					270			
Ser	Asp	Val	Thr	Leu	Asn	Thr	Gly	Ser	Val	Ile	His	Ile	Pro	Leu	Arg	
		275					280					285				
Gln	Gly	Thr	Gln	Leu	Asp	Ile	Glu	Ala	Thr	Phe	His	Leu	Asp	Ala	Ser	
	290					295					300					
Ala	Val	Ala	Ala	Leu	Asn	Glu	Ala	Asp	Val	Gly	Tyr	Asn	Cys	Ser	Ser	
305					310					315					320	
Ser	Gly	Gly	Ala	Val	Asn	Arg	Gly	Ala	Leu	Gly	Pro	Phe	Gly	Leu	Leu	
				325					330					335		
Val	Leu	Ala	Ala	Gly	Asp	Arg	Arg	Gly	Glu	Gln	Thr	Ala	Val	Tyr	Phe	
			340					345					350			
Tyr	Val	Ser	Arg	Gly	Leu	Asp	Gly	Gly	Leu	His	Thr	Ser	Phe	Cys	Gln	
		355					360					365				
Asp	Glu	Leu	Arg	Ser	Ser	Arg	Ala	Lys	Asp	Val	Thr	Lys	Arg	Val	Ile	
	370					375					380					
Gly	Ser	Thr	Val	Pro	Val	Leu	Asp	Gly	Glu	Ala	Phe	Ser	Met	Arg	Val	
385					390					395					400	
Leu	Val	Asp	His	Ser	Ile	Val	Gln	Gly	Phe	Ala	Met	Gly	Gly	Arg	Thr	
				405					410					415		

Thr Met Thr Ser Arg Val Tyr Pro Met Glu Ala Tyr Gln Glu Ala Lys
420 425 430

Val Tyr Leu Phe Asn Asn Ala Thr Gly Ala Ser Val Met Ala Glu Arg
435 440 445

Leu Val Val His Glu Met Asp Ser Ala His Asn Gln Leu Ser Asn Met
450 455 460

Asp Asp His Ser Tyr Val Gln
465 470

<210> 11
<211> 476
<212> DNA
<213> Triticum aestivum

<400> 11
gcacgagcca c gatgacgtc gcgggtgtac ccgatggagg cctatcagga ggcaaaagtg 60
tacttggttca acaatgccac cggtgccagc gttacggcgg aaaggctcgt cgtgcacgag 120
atggactcag cacacaacca gctctccaat atggacgatt actcgtatgt tcaatgaagc 180
tcttgcatct catcagtaat aagctacatt ggatcaaaga cgctcaccaa ggaaggccaa 240
gacatatatt taaacgattc cgcacagcct cgcttgcaaga attgaaacat ctatccttgg 300
gtcatgttct gcattgatgt cacagtgaac tatattactt tgttgggtgt aggatcgata 360
tagtttgggt ggggtggaact ttgtttgttt acatagtgaac ccggtgtggt ctgcataata 420
agcttatgtg tttgtttaga aaatgaatta ttgttggttaa aaaaaaaaaa aaaaaa 476

<210> 12
<211> 58
<212> PRT
<213> Triticum aestivum

<400> 12
Ala Arg Ala Thr Met Thr Ser Arg Val Tyr Pro Met Glu Ala Tyr Gln
1 5 10 15

Glu Ala Lys Val Tyr Leu Phe Asn Asn Ala Thr Gly Ala Ser Val Thr
20 25 30

Ala Glu Arg Leu Val Val His Glu Met Asp Ser Ala His Asn Gln Leu
35 40 45

Ser Asn Met Asp Asp Tyr Ser Tyr Val Gln
50 55

<210> 13
<211> 2093
<212> DNA
<213> Parthenium argentatum Grey

<400> 13
gcacgagcgt gtacatagta aaaaaaccct ccagccacca catgatggct tcatctacca 60
ccacctcccc tctcattctc cacgatgacg ctgaaaacct ccaggaacct accggattta 120
cggggggttcg tctgccatcc atcgcaaaag cgctttgctg aacccttggt tgggttatgg 180
taatctgtgg tctggttgct gtaatcagca accagacaca ggtaccacaa gtagccaaca 240
gccatcaagg tgccgccacc acattcacaa ctgagttgcc aaaaatagat atgaaacggg 300
ttccgggaga gttggattcg ggtgctgatg tccaatggca acgctccgct tatcattttc 360
aacctgacaa aaactacatt agtgatcctg atggcccaat gtatcacatg ggatgggtacc 420
atctatttta tcagtacaac ccagaatctg ccatatgggg caacatcaca tgggggtcact 480

```

ccgtatccaa agacatgac aactgggtcc atctcccttt cgccatgggt cgggaccatt 540
ggtagacacat cgaaggcgctc atgacagggt ccgccacagt cctcccaaac ggtgagatca 600
tcatgtcttta cacgggcaat gcgtacgac tctcccaagt acaatgctta gcgtacgcag 660
tcaactcatc agatccactt cttatagagt ggaaaaaata cgaaggcaac cgggttttat 720
tgccgccgcc aggggtgggt tacaaggatt ttcgggaccc atctacattg tggctgggcc 780
ccgatgggtga atatagaatg gtaatggggg ccaagcacia cgagactatt ggttgtgctt 840
tgattttacca taccactaat tttacgcatt ttgaattgaa tgaggagggtg cttcatgcgg 900
tcccacatac tggatatgtg gaatgcgttg atctttatcc ggtatccacc acacacacaa 960
acgggttga catggtggat aatgggcca atgtaaaata cgtgttgaaa caaagtgggg 1020
atgaagatcg ccatgattgg tatgcgattg gaagttatga ttgggtgaat gataagtgg 1080
acccgatga cccgaaaac gatgtggga tcgggttaag atacgattac ggaaagtttt 1140
atgcgtccaa gacgttttat gaccaacata agaaaaggag ggtcctttgg ggctatgttg 1200
gagaaaccga tcccgaagg tatgacctta caaagggatg ggctaacata ttgaatatc 1260
caaggaccgt cgttttggac acgaaaacta aaaccaattt gattcaatgg ccaattgagg 1320
aaaccgaaaa acttaggtcg aaaaagtatg ataaatttgt agatgtggag cttcgaccgg 1380
ggtcactcat tcccctcgag ataggtacag ccacacagtt ggatatagtt gcgacattcg 1440
aagttgatca aatgatgttg gaatcaacgc tagaagccga tgttctattc aactgcacga 1500
ctagtgttg ctcagttgga aggggcgtgt tgggaccgtt tgggtgtggtg gttctagctg 1560
atgccagcg caccgaacaa cttcctgtgt atttctatat tgcaaaagat accgacggga 1620
cgtcaagaac ctacttttgt gctgatgaaa caagatcatc caaggatgta gcgtgggga 1680
aatgggtgta tgggaagcgt gttcctgtcc tccctaacga aaagtacaat atgaggttac 1740
tgggtgatca ttcgatagtg gagggatttg cacaaaaacg aagaacggtg gtgacatcga 1800
gagtgtatcc aacgaaggca atttacaacg ctgcgaaggt gtttttgttc aacaacgcga 1860
ccgggattag ggtgaaggcg tcggtcaaga tttggaagat ggcggaagca gaactcaacc 1920
ctttccagat tactgggtg acttcttgat ggctagattt tggccctat atgtgtgtgt 1980
tactatcgtg aggtatatgt cttggactgt ggggggtatta ttgtaatttg atatgtatgt 2040
tctgttactt ttgaggttct agtttaaaaa aaaaaaaaaa aaaaaaaaaa aaa 2093

```

<210> 14

<211> 635

<212> PRT

<213> *Parthenium argentatum* Grey

<400> 14

```

Met Met Ala Ser Ser Thr Thr Thr Ser Pro Leu Ile Leu His Asp Asp
  1                      5                      10          15

```

```

Pro Glu Asn Leu Gln Glu Pro Thr Gly Phe Thr Gly Val Arg Arg Pro
          20                25                30

```

```

Ser Ile Ala Lys Ala Leu Cys Val Thr Leu Val Ser Val Met Val Ile
      35                40                45

```

```

Cys Gly Leu Val Ala Val Ile Ser Asn Gln Thr Gln Val Pro Gln Val
      50                55                60

```

```

Ala Asn Ser His Gln Gly Ala Ala Thr Thr Phe Thr Thr Gln Leu Pro
      65                70                75                80

```

```

Lys Ile Asp Met Lys Arg Val Pro Gly Glu Leu Asp Ser Gly Ala Asp
          85                90                95

```

```

Val Gln Trp Gln Arg Ser Ala Tyr His Phe Gln Pro Asp Lys Asn Tyr
      100                105                110

```

```

Ile Ser Asp Pro Asp Gly Pro Met Tyr His Met Gly Trp Tyr His Leu
      115                120                125

```

```

Phe Tyr Gln Tyr Asn Pro Glu Ser Ala Ile Trp Gly Asn Ile Thr Trp
      130                135                140

```

[illegible]

Thr Phe Glu Val Asp Gln Met Met Leu Glu Ser Thr Leu Glu Ala Asp
 465 470 475 480
 Val Leu Phe Asn Cys Thr Thr Ser Val Gly Ser Val Gly Arg Gly Val
 485 490 495
 Leu Gly Pro Phe Gly Val Val Val Leu Ala Asp Ala Gln Arg Thr Glu
 500 505 510
 Gln Leu Pro Val Tyr Phe Tyr Ile Ala Lys Asp Thr Asp Gly Thr Ser
 515 520 525
 Arg Thr Tyr Phe Cys Ala Asp Glu Thr Arg Ser Ser Lys Asp Val Asp
 530 535 540
 Val Gly Lys Trp Val Tyr Gly Ser Ser Val Pro Val Leu Pro Asn Glu
 545 550 555 560
 Lys Tyr Asn Met Arg Leu Leu Val Asp His Ser Ile Val Glu Gly Phe
 565 570 575
 Ala Gln Asn Gly Arg Thr Val Val Thr Ser Arg Val Tyr Pro Thr Lys
 580 585 590
 Ala Ile Tyr Asn Ala Ala Lys Val Phe Leu Phe Asn Asn Ala Thr Gly
 595 600 605
 Ile Arg Val Lys Ala Ser Val Lys Ile Trp Lys Met Ala Glu Ala Glu
 610 615 620
 Leu Asn Pro Phe Pro Val Thr Gly Trp Thr Ser
 625 630 635

<210> 15
 <211> 2107
 <212> DNA
 <213> Helianthus sp.

<400> 15
 gcaccacaac acacttaagt gcgtgtacat aataaagaaa aaaccctcct gccaccacat 60
 gatggcttca tccaccacca ccaccctct cattctccat gatgaccctg aaaacctccc 120
 agaactcacc ggatctccga caactcgtcg tctatccatc gcaaaagtgc tttcggggat 180
 ccttgtttctg gttctagtta catgtgctct tgttgcttta atcaacaacc aaacatatga 240
 accaccgcg gccaccacat tcgcaactca gttgccaaat attgatctga agcgggttcc 300
 aggaaagtgtg gattcgagtg ctgaggttga atggcaacga tccgcttctc attttcaacc 360
 cgacaaaaat ttcattagtg atcctgatgg cccaatgtat cacatgggat ggtaccatct 420
 attctatcag tacaaccctg aatctgccat ctggggcaac atcacatggg gccactcggg 480
 atcgaaagac atgatcaact ggttccatct ccctttcgcc atgggttcctg accattggta 540
 cgacatcgaa ggtgtcatga cgggttcggc tacagtcctc cctaattggc aaatcatcat 600
 gctttacacg ggcaacgcgt acgatctctc ccaagtacaa tgcttgatc acgctgtcaa 660
 ctgctcgatg ccccttctta tagagtggaa aaaatatgaa ggtaaccctg tcttggtccc 720
 accaccagga gtgggtaca aggactttcg ggacccatcc acattgtggt tgggccctga 780
 tgggaatat agaatggtaa tgggttccaa gcacaacgag actattggat gtgctttgat 840
 ttaccatacc actaatttta cgcattttga attgaaagag gaggtgcttc atgcagtccc 900
 acatactggt atgtgggaat gtgttgatct ttaccacagt tccaccgtac acacaaacgg 960
 gttggacatg gtggataacg ggccaaatgt taaatacgtg ttgaaacaaa gtggggatga 1020
 agatcgccat gattggtatg caattggaag ttatgatgtg gtgaatgata agtggtaccc 1080
 ggatgacccg gaaaatgatg tgggtatttg attaagatat gattttggaa aattttatgc 1140
 gtccaagact ttttatgacc aacataagaa gaggagggtc ctttggggct atgttgagga 1200

Val	Gln	Cys	Leu	Ala	Tyr	Ala	Val	Asn	Ser	Ser	Asp	Pro	Leu	Leu	Ile
		195					200					205			
Glu	Trp	Lys	Lys	Tyr	Glu	Gly	Asn	Pro	Val	Leu	Phe	Pro	Pro	Pro	Gly
	210					215					220				
Val	Gly	Tyr	Lys	Asp	Phe	Arg	Asp	Pro	Ser	Thr	Leu	Trp	Leu	Gly	Pro
225					230					235					240
Asp	Gly	Glu	Tyr	Arg	Met	Val	Met	Gly	Ser	Lys	His	Asn	Glu	Thr	Ile
				245					250					255	
Gly	Cys	Ala	Leu	Ile	Tyr	His	Thr	Thr	Asn	Phe	Thr	His	Phe	Glu	Leu
			260					265					270		
Lys	Glu	Glu	Val	Leu	His	Ala	Val	Pro	His	Thr	Gly	Met	Trp	Glu	Cys
		275					280					285			
Val	Asp	Leu	Tyr	Pro	Val	Ser	Thr	Val	His	Thr	Asn	Gly	Leu	Asp	Met
	290					295					300				
Val	Asp	Asn	Gly	Pro	Asn	Val	Lys	Tyr	Val	Leu	Lys	Gln	Ser	Gly	Asp
305					310					315					320
Glu	Asp	Arg	His	Asp	Trp	Tyr	Ala	Ile	Gly	Ser	Tyr	Asp	Val	Val	Asn
				325					330					335	
Asp	Lys	Trp	Tyr	Pro	Asp	Asp	Pro	Glu	Asn	Asp	Val	Gly	Ile	Gly	Leu
			340					345					350		
Arg	Tyr	Asp	Phe	Gly	Lys	Phe	Tyr	Ala	Ser	Lys	Thr	Phe	Tyr	Asp	Gln
		355					360					365			
His	Lys	Lys	Arg	Arg	Val	Leu	Trp	Gly	Tyr	Val	Gly	Glu	Thr	Asp	Pro
	370					375					380				
Gln	Lys	Tyr	Asp	Ile	Ser	Lys	Gly	Trp	Ala	Asn	Ile	Leu	Asn	Ile	Pro
385					390					395					400
Arg	Thr	Val	Val	Leu	Asp	Thr	Lys	Thr	Lys	Thr	Asn	Leu	Ile	Gln	Trp
				405				410						415	
Pro	Ile	Glu	Glu	Thr	Glu	Asn	Leu	Arg	Ser	Lys	Thr	Tyr	Asp	Glu	Phe
			420					425					430		
Lys	Asp	Val	Glu	Leu	Arg	Pro	Gly	Ser	Leu	Val	Pro	Leu	Glu	Ile	Gly
		435					440					445			
Thr	Ala	Thr	Gln	Leu	Asp	Ile	Val	Ala	Thr	Phe	Glu	Ile	Asp	Gln	Lys
	450					455					460				
Met	Leu	Glu	Ser	Thr	Leu	Glu	Ala	Asp	Val	Leu	Phe	Asn	Cys	Thr	Thr
465					470					475					480
Ser	Glu	Gly	Ser	Val	Ala	Arg	Gly	Ala	Leu	Gly	Pro	Phe	Gly	Val	Val
				485					490					495	
Val	Leu	Ala	Asp	Ala	Gln	Arg	Ser	Glu	Gln	Leu	Pro	Val	Tyr	Phe	Tyr
			500					505					510		

Ile Ala Lys Asp Ile Asp Gly Thr Ser Arg Thr Tyr Phe Cys Ala Asp
 515 520 525
 Glu Thr Arg Ser Ser Lys Asp Val Ser Val Gly Lys Trp Val Tyr Gly
 530 535 540
 Ser Ser Val Pro Val Leu Pro Gly Glu Lys Tyr Asn Met Arg Leu Leu
 545 550 555 560
 Val Asp His Ser Ile Val Glu Gly Phe Ala Gln Asn Gly Arg Thr Val
 565 570 575
 Val Thr Ser Arg Val Tyr Pro Thr Lys Ala Ile Tyr Asn Ala Ala Lys
 580 585 590
 Val Phe Leu Phe Asn Asn Ala Thr Gly Ile Ser Val Lys Ala Ser Ile
 595 600 605
 Lys Ile Trp Lys Met Ala Lys Ala Glu Leu Asn Pro Phe Pro Leu Pro
 610 615 620
 Gly Trp Thr Phe Glu Leu
 625 630
 <210> 17
 <211> 615
 <212> PRT
 <213> Helianthus tuberosus
 <400> 17
 Met Gln Thr Pro Glu Pro Phe Thr Asp Leu Glu His Glu Pro His Thr
 1 5 10 15
 Pro Leu Leu Asp His His His Asn Pro Pro Gln Thr Thr Thr Lys
 20 25 30
 Pro Leu Phe Thr Arg Val Val Ser Gly Val Thr Phe Val Leu Phe Phe
 35 40 45
 Phe Gly Phe Ala Ile Val Phe Ile Val Leu Asn Gln Gln Asn Ser Ser
 50 55 60
 Val Arg Ile Val Thr Asn Ser Glu Lys Ser Phe Ile Arg Tyr Ser Gln
 65 70 75 80
 Thr Asp Arg Leu Ser Trp Glu Arg Thr Ala Phe His Phe Gln Pro Ala
 85 90 95
 Lys Asn Phe Ile Tyr Asp Pro Asp Gly Gln Leu Phe His Met Gly Trp
 100 105 110
 Tyr His Met Phe Tyr Gln Tyr Asn Pro Tyr Ala Pro Val Trp Gly Asn
 115 120 125
 Met Ser Trp Gly His Ser Val Ser Lys Asp Met Ile Asn Trp Tyr Glu
 130 135 140
 Leu Pro Val Ala Met Val Pro Thr Glu Trp Tyr Asp Ile Glu Gly Val
 145 150 155 160

THE

Ser Leu Gly Pro Phe Gly Leu Ala Val Leu Ala Asp Gly Thr Leu Ser
485 490 495

Glu Leu Thr Pro Val Tyr Phe Tyr Ile Ala Lys Lys Ala Asp Gly Gly
500 505 510

Val Ser Thr His Phe Cys Thr Asp Lys Leu Arg Ser Ser Leu Asp Tyr
515 520 525

Asp Gly Glu Arg Val Val Tyr Gly Gly Thr Val Pro Val Leu Asp Asp
530 535 540

Glu Glu Leu Thr Met Arg Leu Leu Val Asp His Ser Ile Val Glu Gly
545 550 555 560

Phe Ala Gln Gly Gly Arg Thr Val Ile Thr Ser Arg Ala Tyr Pro Thr
565 570 575

Lys Ala Ile Tyr Glu Gln Ala Lys Leu Phe Leu Phe Asn Asn Ala Thr
580 585 590

Gly Thr Ser Val Lys Ala Ser Leu Lys Ile Trp Gln Met Ala Ser Ala
595 600 605

Pro Ile His Gln Tyr Pro Phe
610 615

<210> 18
<211> 630
<212> PRT
<213> Helianthus tuberosus

<400> 18
Met Met Ala Ser Ser Thr Thr Thr Thr Pro Leu Ile Leu His Asp Asp
1 5 10 15

Pro Glu Asn Leu Pro Glu Leu Thr Gly Ser Pro Thr Thr Arg Arg Leu
20 25 30

Ser Ile Ala Lys Val Leu Ser Gly Ile Leu Val Ser Val Leu Val Ile
35 40 45

Gly Ala Leu Val Ala Leu Ile Asn Asn Gln Thr Tyr Glu Ser Pro Ser
50 55 60

Ala Thr Thr Phe Val Thr Gln Leu Pro Asn Ile Asp Leu Lys Arg Val
65 70 75 80

Pro Gly Lys Leu Asp Ser Ser Ala Glu Val Glu Trp Gln Arg Ser Thr
85 90 95

Tyr His Phe Gln Pro Asp Lys Asn Phe Ile Ser Asp Pro Asp Gly Pro
100 105 110

Met Tyr His Met Gly Trp Tyr His Leu Phe Tyr Gln Tyr Asn Pro Gln
115 120 125

Ser Ala Ile Trp Gly Asn Ile Thr Trp Gly His Ser Val Ser Lys Asp
130 135 140

Met	Ile	Asn	Trp	Phe	His	Leu	Pro	Phe	Ala	Met	Val	Pro	Asp	His	Trp	145	150	155	160
Tyr	Asp	Ile	Glu	Gly	Val	Met	Thr	Gly	Ser	Ala	Thr	Val	Leu	Pro	Asn	165	170	175	
Gly	Gln	Ile	Ile	Met	Leu	Tyr	Ser	Gly	Asn	Ala	Tyr	Asp	Leu	Ser	Gln	180	185	190	
Val	Gln	Cys	Leu	Ala	Tyr	Ala	Val	Asn	Ser	Ser	Asp	Pro	Leu	Leu	Ile	195	200	205	
Glu	Trp	Lys	Lys	Tyr	Glu	Gly	Asn	Pro	Val	Leu	Leu	Pro	Pro	Pro	Gly	210	215	220	
Val	Gly	Tyr	Lys	Asp	Phe	Arg	Asp	Pro	Ser	Thr	Leu	Trp	Ser	Gly	Pro	225	230	235	240
Asp	Gly	Glu	Tyr	Arg	Met	Val	Met	Gly	Ser	Lys	His	Asn	Glu	Thr	Ile	245	250	255	
Gly	Cys	Ala	Leu	Ile	Tyr	His	Thr	Thr	Asn	Phe	Thr	His	Phe	Glu	Leu	260	265	270	
Lys	Glu	Glu	Val	Leu	His	Ala	Val	Pro	His	Thr	Gly	Met	Trp	Glu	Cys	275	280	285	
Val	Asp	Leu	Tyr	Pro	Val	Ser	Thr	Val	His	Thr	Asn	Gly	Leu	Asp	Met	290	295	300	
Val	Asp	Asn	Gly	Pro	Asn	Val	Lys	Tyr	Val	Leu	Lys	Gln	Ser	Gly	Asp	305	310	315	320
Glu	Asp	Arg	His	Asp	Trp	Tyr	Ala	Ile	Gly	Ser	Tyr	Asp	Ile	Val	Asn	325	330	335	
Asp	Lys	Trp	Tyr	Pro	Asp	Asp	Pro	Glu	Asn	Asp	Val	Gly	Ile	Gly	Leu	340	345	350	
Arg	Tyr	Asp	Phe	Gly	Lys	Phe	Tyr	Ala	Ser	Lys	Thr	Phe	Tyr	Asp	Gln	355	360	365	
His	Lys	Lys	Arg	Arg	Val	Leu	Trp	Gly	Tyr	Val	Gly	Glu	Thr	Asp	Pro	370	375	380	
Gln	Lys	Tyr	Asp	Leu	Ser	Lys	Gly	Trp	Ala	Asn	Ile	Leu	Asn	Ile	Pro	385	390	395	400
Arg	Thr	Val	Val	Leu	Asp	Leu	Glu	Thr	Lys	Thr	Asn	Leu	Ile	Gln	Trp	405	410	415	
Pro	Ile	Glu	Glu	Thr	Glu	Asn	Leu	Arg	Ser	Lys	Lys	Tyr	Asp	Glu	Phe	420	425	430	
Lys	Asp	Val	Glu	Leu	Arg	Pro	Gly	Ala	Leu	Val	Pro	Leu	Glu	Ile	Gly	435	440	445	
Thr	Ala	Thr	Gln	Leu	Asp	Ile	Val	Ala	Thr	Phe	Glu	Ile	Asp	Gln	Lys	450	455	460	


```

ggcgcggtgct gatgggggtac gtcgggcgagg tcgactccaa gcgggctgat gtcgtgaagg 1200
gatggggcctc gattcagtcg gttccaagga caattgctct cgacgagaag acccggaaga 1260
acctcctcct ctggcccgtg gaggagattg agaccctccg cctcaacgcc accgaactta 1320
gcgacgtcac ccttaacacc ggctccgtca tccatatccc gctccgcca ggcactcagc 1380
tcgacatcga ggcaactttc caccttgatg cttctgccgt cgctgccctc aatgaggccg 1440
atgtgggcta caactgcagc agcagcggcg gtgctggtta cgcgggcgcg ctaggcccct 1500
tcggcctcct cgtcctcgct gctggtgacc gccgtggcga gcaaacggcg gtgtatttct 1560
acgtgtctag ggggctcgac ggaggcctcc ataccagctt ctgccaagac gagttgcggt 1620
cgtcacgggc caaggatgtg acgaagcggg tgattgggag cacggtgccg gtgctcgacg 1680
gcgaggcttt ctcgatgagg gtgctcgtgg accactccat cgtgcagggc ttgcgcatgg 1740
gcgggaggag cacgatgacg tcgcggtgtg accgatgga ggcctatcag gaggcaaaag 1800
tgtacttggt caacaatgcg accggtgccg gcgtcatggc ggaaaggctc gtcgtgcacg 1860
agatggactc agcacacaac cagctctcca atatggacga tcactcgtat gttcaatgaa 1920
gctcttgcat ctcacatgta ataagctaca ttggatcaaa gacgcgcacc aaggaaggcc 1980
aagacatatg taaatgattc cgcacagcct cgcttgacga attgaaacat ctatccttgg 2040
gtcatgttct gcattgatgt cactgtgaac tacagtatat tactttgttg ggcgtagaaa 2100
aaaaaaaaa aaaaaa 2115

```

<210> 20

<211> 600

<212> PRT

<213> Triticum aestivum

<400> 20

```

Met Ala Ser Glu Ser Ser Arg Arg Gly Asp Ser Thr Ser Thr Arg Arg
  1                      5                      10                      15

```

```

Arg Ser Gly Gln Glu Pro Leu Ala Val Leu Val Ser Ala Lys Asn Gln
      20                      25                      30

```

```

Ser Ser Ser Glu Glu Arg Ala Gly Gly Gly Leu Arg Val Asp Glu Glu
      35                      40                      45

```

```

Ala Ala Ala Gly Phe Pro Trp Ser Asn Glu Met Leu Gln Trp Gln Arg
      50                      55                      60

```

```

Ser Gly Tyr His Phe Gln Thr Ala Lys Asn Tyr Met Ser Asp Pro Asn
      65                      70                      75                      80

```

```

Gly Leu Met Tyr Tyr Asn Gly Trp Tyr His Met Phe Phe Gln Tyr Asn
      85                      90                      95

```

```

Pro Val Gly Thr Asp Trp Asp Asp Gly Met Glu Trp Gly His Ala Val
      100                      105                      110

```

```

Ser Arg Asn Leu Val Thr Trp Arg Thr Leu Pro Ile Ala Met Val Ala
      115                      120                      125

```

```

Asp Gln Trp Tyr Asp Ile Leu Gly Val Leu Ser Gly Ser Met Thr Val
      130                      135                      140

```

```

Leu Pro Asn Gly Thr Val Ile Met Ile Tyr Thr Gly Ala Thr Asn Ala
      145                      150                      155                      160

```

```

Ser Ala Val Glu Val Gln Cys Ile Ala Thr Pro Ala Asp Pro Asn Asp
      165                      170                      175

```

```

Pro Phe Leu Arg Arg Trp Thr Lys His Pro Ala Asn Pro Val Ile Trp
      180                      185                      190

```


[illegible]

[illegible]

<400> 21															
Met	Gly	Ser	His	Gly	Lys	Pro	Pro	Leu	Pro	Tyr	Ala	Tyr	Lys	Pro	Leu
1				5					10					15	
Pro	Ser	Asp	Ala	Ala	Asp	Gly	Lys	Arg	Thr	Gly	Cys	Met	Arg	Trp	Ser
			20					25					30		
Ala	Cys	Ala	Thr	Val	Leu	Thr	Ala	Ser	Ala	Met	Ala	Val	Val	Val	Val
		35					40					45			
Gly	Ala	Thr	Leu	Leu	Ala	Gly	Leu	Arg	Met	Glu	Gln	Ala	Val	Asp	Glu
	50					55					60				
Glu	Ala	Ala	Ala	Gly	Gly	Phe	Pro	Trp	Ser	Asn	Glu	Met	Leu	Gln	Trp
65					70					75					80
Gln	Arg	Ser	Gly	Tyr	His	Phe	Gln	Thr	Ala	Lys	Asn	Tyr	Met	Ser	Asp
				85					90					95	
Pro	Asn	Gly	Leu	Met	Tyr	Tyr	Arg	Gly	Trp	Tyr	His	Met	Phe	Tyr	Gln
			100					105					110		
Tyr	Asn	Pro	Val	Gly	Thr	Asp	Trp	Asp	Asp	Gly	Met	Glu	Trp	Gly	His
		115					120					125			
Ala	Val	Ser	Arg	Asn	Leu	Val	Gln	Trp	Arg	Thr	Leu	Pro	Ile	Ala	Met
	130					135					140				
Val	Ala	Asp	Gln	Trp	Tyr	Asp	Ile	Leu	Gly	Val	Leu	Ser	Gly	Ser	Met
145					150					155					160
Thr	Val	Leu	Pro	Asn	Gly	Thr	Val	Ile	Met	Ile	Tyr	Thr	Gly	Ala	Thr
				165					170					175	
Asn	Ala	Ser	Ala	Val	Glu	Val	Gln	Cys	Ile	Ala	Thr	Pro	Ala	Asp	Pro
			180					185					190		

Phe Cys Gln Asp Glu Leu Arg Ser Ser Arg Ala Lys Asp Val Thr Lys
 515 520 525

Arg Val Ile Gly Ser Thr Val Pro Val Leu Asp Gly Glu Ala Leu Ser
 530 535 540

Met Arg Val Leu Val Asp His Ser Ile Val Gln Gly Phe Asp Met Gly
 545 550 555 560

Gly Arg Thr Thr Met Thr Ser Arg Val Tyr Pro Met Glu Ser Tyr Gln
 565 570 575

Glu Ala Arg Val Tyr Leu Phe Asn Asn Ala Thr Gly Ala Ser Val Thr
 580 585 590

Ala Glu Arg Leu Val Val His Glu Met Asp Ser Ala His Asn Gln Leu
 595 600 605

Ser Asn Glu Asp Asp Gly Met Tyr Leu His Gln Val Leu Glu Ser Arg
 610 615 620

His
 625

FOOEEOT = 26EEEOOT